**The University of New Mexico**

**School of Engineering**

**Electrical and Computer Engineering Department**

**ECE 535 Satellite Communications**

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Module # 14: Problems 14.1, 14.2, 14.3, 14.4, 14.6, 14.7, 14.8

Summer 2025

**Prof. Tarief Elshafiey**

14.1. Explain what is meant by a single access in relation to a satellite communications network. Give an example of the type of traffic route where single access would be used.

14.2. Distinguish between preassigned and demand-assigned traffic in relation to a satellite communications network.

14.3. Explain what is meant by FDMA, and show how this differs from FDM.

14.4. Explain what the abbreviation SCPC stands for. Explain in detail the operation of a preassigned SCPC network.

14.6. Briefly describe the ways in which demand assignment may be carried out in an FDMA network.

14.7. Explain in detail the operation of the Spade system of demand assignment. What is the function of the common signaling channel?

14.8. Explain what is meant by power-limited and bandwidth-limited operation as applied to an FDMA network. In an FDMA scheme the carriers utilize equal powers and equal bandwidths, the bandwidth in each case being 5 MHz. The transponder bandwidth is 36 MHz. The saturation EIRP for the downlink is 34 dBW, and an output backoff of 6 dB is employed. The downlink losses are 201 dB, and the destination earth station has a G/T ratio of 35 dBK1 . Determine the [C/N] value assuming this is set by single carrier operation. Determine also the number of carriers which can access the system, and state, with reasons, whether the system is power limited or bandwidth limited.